A COMPARISON OF DEPRECIATION METHODS UNDER CURRENT COST ACCOUNTING: REPLY

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Rose (1980) makes several comments regarding my comparison of depreciation methods under Current Cost Accounting (CCA). Some of his concern appears to be based on a misapprehension as to the nature of the measure of depreciation referred to in my paper (viz. money value versus current cost value). Also, he claims that the use of a single estimate of the rate of depreciation is invalid, but this is common practice using standard depreciation formulae at present, and the rates are chosen on a much more arbitrary basis than proposed in my paper. There is some validity in his comment that the values observed in the market are not representaive of all machines in the original stock. However, this is not likely to affect greatly the optimal rate of depreciation derived from the study. A further point raised relates to the treatment of the investment allowance in the original paper.

These four points are discussed below.

Value of Depreciation

Rose suggests that, while my estimate of the rate of physical decline may be reasonable, the method of calculating the money value of depreciation is not. In fact, the formula used is not intended to measure the money value of depreciation but rather the 'real' or current cost value as outlined in the Richardson Report (1976, ch. 17). Thus, the correct formula for calculating depreciation is:

(1) $$X_k = V_{k-1}\,(I_k/I_{k-1}) - V_k$$

rather than:

(2) $$X_k = V_{k-1} - V_k$$

as suggested by Rose.

Equation (1) is similar to one of the alternatives outlined by Swan (1978, proposition 2A) except that Swan concludes that the inflation factor (I_k/i_{k-1}) should relate to general inflation (consumer prices) rather than to the inflation in machinery prices. Depreciation calculated as in equation (1) includes a capital maintenance adjustment in addition to the normal 'economic depreciation' calculated from equation (2). Any difference between CCA depreciation and that proposed by Swan will relate to the difference between general inflation and inflation in machinery prices. Swan points out that, for a tax system based on nominal values, only a depreciation rule based on economic depreciation as represented by equation (2) would be neutral (as noted by Rose). He also points out, however, that a depreciation rule based on equation (1) (but using a general inflation index) will be neutral for a tax system based on the net

interest rate (i.e. adjusted for inflation). Swan favours a system of taxation in which the real income of capital and the real return from interest receipts are taxed—along the lines of CoCoA (Continuously Contemporary Accounting) rather than CCA. It was not the intention in my paper, however, to compare alternative forms of inflation accounting. Instead, the stated aim was to compare various possible CCA depreciation methods to determine which might best be used to predict replacement values, and to compare the resultant measures of depreciation with those currently allowable under New Zealand taxation laws.

Given that the formula put forward by Rose (equation (2)) represents the money value of depreciation, whereas my own (equation (1)) relates to current cost, it is to be expected that the two will be equivalent only when there is no inflation (i.e. $(I_k/I_{k-1}) = 1$). The claim of proponents of CCA is that the 'consistent overestimates of depreciation' referred to by Rose are in fact the degree to which depreciation is underestimated under historical cost accounting.

Single Estimate for Rate of Depreciation (R)

Rose criticises the fact that I have presented only a single estimate of R without indicating the value of I_{bk}/I_{bk-1} used. The initial study was limited to a comparison of a commonly used depreciation formula adapted to a current cost form. The aim was to find which formula (at what rate) gave the best fit between book values and actual replacement values (at the end of 1976/77). Different inflation factors (I_k/I_o) were used for each item of machinery, depending on the number of years which had elapsed since its purchase. (I_o is the replacement cost inflation index at the time of purchase, and I_k is the replacement cost inflation index at the end of the year k (1976/77).) Hence, it is not possible to adjust my depreciation estimates (if this is deemed necessary) by a single I_k/I_o factor (Rose: I_{bk}/I_{bk-1}) as outlined in Rose's Table 1.

A different depreciation rate (R) for each year could possibly have been calculated over the last 25 or so years covered by the study if data on replacement values were available over time. If standardised depreciation formulae are to be used under a CCA system, however, it is unlikely that different depreciation rates would be used every year. Calculation of a different rate each year would require opening and closing valuations for the item or class of machinery under discussion. I suggested (p. 42) that, since the rate of depreciation is due at least partly to economic factors, it may well change over time and, hence, the optimal depreciation rates outlined in my paper would need to be reviewed periodically if they were to be adopted for general use.

The aim of the study was to find a rate which resulted in a reasonable estimate of replacement value using only purchase price and inflation since the time of purchase. Whilst not being entirely accurate, this was considered to be superior to selecting arbitrarily a depreciation rate for use in a standard depreciation formula as at present.

Values Observed in the Market not Representative of All Machines in the Original Stock

Rose points out that the values observed in the market are not representative of all machines in the original stock. While this is true, it is

unlikely to affect greatly the estimated depreciation rate. Firstly, that proportion of machines no longer usable does not necessarily have a zero salvage value as suggested by Rose. Secondly, the age at which machines start to exit the stock of machines actually in operation is unlikely to be less than 10 to 15 years. At that time, diminishing value depreciation using a 15 per cent depreciation rate (for example) will result in book values of 19.7 per cent (10 years) to 8.7 per cent (15 years) of purchase price anyway. Thus the actual salvage values may not be very much less than the calculated book values.

The drop in market values over the first few years of a machine's life will have the greatest effect on the depreciation rate chosen since the amount of depreciation (in absolute terms) is much greater in this period than in later years.

Investment Allowances

Rose contends that 'the nominal price of a new machine is not the relevant starting point for depreciating the machine' yet this is a commonly accepted accounting practice and, as Rose himself points out, modification of the nominal price to take account of the investment allowance would be a difficult task.

My statement (p. 40) that the 'significance of this item was also determined for the survey sample . . .' does not refer to the effect of the investment allowance in reducing the effective purchase price. It refers instead to the calculation of the investment allowance on new machines purchased in 1976/77 and averaged over the whole sample for both tractors and headers. The results of these calculations are shown in Table 4 (p. 45). It was pointed out that this increased the total taxation allowance for tractors in 1976/77 (i.e. historical cost depreciation plus investment allowance) above that which might have been allowed under CCA (with no investment allowance). Because there were fewer new headers in the sample, average total taxation allowance (1976/77) for these was still below that indicated by the current cost calculation.

Elimination of the investment allowance would presumably reduce the rate of economic depreciation since there would be less incentive to buy new machines. With the introduction of CCA, relatively more depreciation would be allowed (for tax purposes) on older machines which would permit more money to be set aside for replacement purposes. On the other hand, the tax incentive to purchase new machinery in terms of relatively higher depreciation allowances on new machinery would be reduced. The combined effect of these changes on the rate of depreciation would be difficult to determine and was considered to be beyond the scope of the original study.

References

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